height approximately fifty miles above the earth's surface.

It is expected that my paper will soon be published in the *Proceedings* of the National Academy of Sciences. In it the arguments are presented in full. ELIHU THOMSON

A BUSINESS MAN'S APPRAISEMENT OF BIOLOGY

THE erection and dedication during recent months of important additions to the physical being of the Scripps Institution for Biological Research of the University of California has brought the name of the chief donor of money, Miss E. B. Scripps, quite conspicuously to public notice. Indeed so exclusively has the growth of the institution seemed in the eyes of the community to be the work of Miss Scripps that a brief statement of what has actually been and is going on here appears almost imperative not only to her but to all who have the welfare of the enterprise at heart.

In what follows I speak primarily in the interest of a department of the University of the State of California, the purpose of which is to investigate nature for the general good, and only secondarily in the interest of the particular persons who will figure in my remarks.

One of the most important secondary services a scientific research institution can render the public is in demonstrating that specialized and disciplined talent for studying nature, business experience and skill, and material wealth must be and can be brought together for the great task of making nature yield its best to the development of man's latent physical and spiritual capacities. A point needing emphasis just now is that no one who has grasped the full meaning of the task, and has had actual experience in it, can possibly raise the question as to which of these three factors is all-important—which is the "real thing" in the undertaking. All are absolutely indispensable, and debate on which is most important is scholastic folly. The reason for these remarks is the circumstance that the temper of the day makes the wealth factor appear to most eyes as the main one, the determining one, the one to which all the others are secondary. The prevalent theory that, after all, he who "holds the purse strings" is the real "power behind the throne" even in educational and scientific institutions, and so is the one to whom homage is chiefly due, is an embryonic trait, as biologists say, in the development of civilization —a trait to be left behind with advance toward adulthood. No one understands this better than do some of those who give large sums of money to public institutions. It does not disparage by one whit the importance of having large wealth and being willing to devote portions of it to the general good to point out that, as everybody knows who is acquainted with Miss Scripps, nothing could be more alien to her nature than to glory in the mere giving of a large sum of money toward the creation of an impressive physical structure dedicated to public use. Evidence that an "investment," be it large or small, contributes substantially to the general welfare, would give her supreme satisfaction, as this would be evidence not of mere ability to give, but to give *wisely*. In how far satisfaction of this sort is coming to Miss Scripps for what she has invested in this enterprise I do not know. I suspect there is still uncertainty in her mind; for the institution is too young to enable her to judge what service it may render.

But the personage primarily in view in this communication is not Miss E. B. Scripps, but Mr. E. W. Scripps. The truth is I am taking it for granted that Miss Scripps recognizes now the desirability of a kind of publicity concerning the origin and aims of the Scripps Institution not hitherto furnished, and that she would be willing to have me use her conception of an "investor" in behalf of the public as a starting point for what I am going to say about her brother. My words are addressed first and foremost to men of science, especially those who reflect on the larger human significance of material knowledge and the discovery of it.

The narration of a bit of personal-professional experience will be permissible, since it

will help to the end aimed at. Whether the Scripps Institution shall or shall not turn out to be useful to mankind, the foundational motive upon which it rests is a faith in the value of science, especially biological science, far more concrete and deep and broad than that which seems to be held by most men of science; and *this is in large measure due to E. W. Scripps.* I must explain. By native inclination the study of nature understood in much the sense of "the contemplation of nature" favored by naturalists a few generations ago, is to me one of the most exalting occupations the human mind can have. During the early part of my apprenticeship in science this feeling found great encouragement through the teachings and life of Joseph Le Conte, with whom at the University of California I came, as student and later as teacher, into close contact. Then there was a period of that intense specialization indispensable to progress in modern science, and with it the narrowing of interest and outlook and sympathy so likely to accompany such specialization. It was in this period of intensified specialization and concomitantly narrowed horizon that the early stages of development of the marine biological work which led to the present institution fell; and it was also in this period that my acquaintance with Mr. Scripps began. I saw him first in the summer of 1903, and the circumstances of the meeting were typical of my whole association with him. Our "marine laboratory" that year was a portion of the boat house on Glorietta Bite, Coronado, this space having been generously given us by the Coronado Beach Company. Mr. Scripps came on purpose to see what was going on, and the thing that especially struck me was his lively, pushing, obviously sincere interest in the details of our work. His visit was no mere hasty, listless walk through the room with a few more or less relevant remarks designed primarily to tell us in the least offensive way possible how really insignificant the whole thing was in his eyes. But with a sort of child-like eagerness he insisted upon being shown something about what each of the half dozen workers was doing. Here indeed was "something new under the sun"—at least to me. A man who, though the central figure in a great business, could yet drive twenty miles to visit a puny little scientific establishment and, though an entire stranger to such a place, could show an interest in not merely the enterprise but the actual work that was obviously genuine and, as to broad features, remarkably intelligent!

A part of my regular duty for a number of years had been to solicit private funds for our struggling enterprise and I had succeeded to some extent in interesting several men of large means in certain aspects of it, chiefly, perhaps, that of how to "let me down" with a minimum of disappointment to me and cost to them. But a few of these men had gone well beyond this and had shown real interest in the general idea of a marine laboratory and had done considerable work and promised to give substantial sums toward accomplishing the end. But never before had I found an interest that was not merely in the general idea or in me personally or professionally, but in science—in biology—*as such.*

Through the intervening years of association with Mr. Scripps, much of the time in the most intimate way, even as to the scientific work of the undertaking, not only have I never heard him so much as hint that any fragment of scientific knowledge or piece of research might be valueless, but his whole attitude and not infrequently his expression have been that of recognition of the inherent worth and dignity of natural knowledge, and most of all, of faith in science, especially, again, in biology, as the very foundation of rational human life in modern society. No scientific man, LeConte possibly excepted, with whom I have ever come in contact, has had so broad, so deep, so unfaltering and withal so intelligent a belief in the greatness and human worth of science, as Mr. Scripps.

Such a conception of nature, and of science as the rational interpretation of nature, held by a man endowed by birth with very unusual powers of mind, but, academically speaking, quite undisciplined in science, and eminently successful in business, has influenced my

thinking and estimates of value during the last decade beyond anything I can here tell. Enough to say that the scientific inquiry which has long been in the forefront of my interest, that namely of what the *real constitution of nature must be in order that it may include man in the full scope of his being,* has become wonderfully specific and real by having this remarkable subject under almost constant observation for so long a period. This perhaps more than any one factor has led me to conclude that the system of nature is, as by instinct almost Mr. Scripps appears to take it, much more intimately and vitally related to man than our modern philosophy or even our science usually recognizes.

Science has made great headway latterly in proving that man is a *part of nature;* but it has not done much toward understanding what nature is *because* man is a part of it.

The exceedingly unfortunate doctrine into which so much of western civilization has fallen, that everything about man which is esteemed supremely good is no part of his real nature but is supernatural (teaching of Christian theology) or is a by-product, an "epiphenomenon" (teaching of neo-Darwinian biology) nowhere finds more positive refutation than in such individuals as Mr. Scripps, whether we observe them as types of organic beings or consider their views about nature and science.

Such reflections have led me to endorse heartily his views that the human species taken exactly as it is and in the entire scope of its life, must be a subject for biological study; and to share his ambitions and intentions that the Scripps Institution shall after a while make some aspect of human biology thus conceived one of its departments of research. Those transcendent concerns of civilized man, the relation between the sexes, war, economics, patriotism, government, esthetics, ethics and religion, can never be treated with that freedom from prejudice and personal interest by which alone general truths can be rightly understood and appraised, excepting through the attainment of that attitude toward the tasks which characterizes the biologist in his dealing with problems of organisms inferior to man. This at least is the conviction we have reached after wide observation of instances and much theoretical discussion. And why in the nature of things should it not be possible to reach such an attitude toward the purely rational aspects of human problems? If man really is a part of nature, as biology confidently affirms that he is, how escape recognizing that if a bird's nest is a proper object for biological inquiry, an Eskimo's snow hut and a millionaire's palace are also? Or that if the mating antics of two spiders are biological phenomena, the Virginia reel and the tango are likewise? Or that if a bird chorus on a spring morning falls within the province of ornithological biology, a symphony concert falls within the province of anthropological biology? And it should be specially noticed that the fact that each of these sets of phenomena falls within the province of general biology does not by any means remove them from more restricted and specialized inquiry. The general biologist whose studies lead him to birds' nests or the courtship of spiders or the song of birds, not only is not disposed to supplant specialists in these subjects, but is led to recognize more than ever the importance and indispensability of their labors. Just as the general biologist who should come upon the subjects of social wasps or singing birds, could not do much without the help of specialists in these subjects, so the biologist who upon occasion should turn to social or musical humans, would be almost helpless without the aid of experts in human society and human music.

Much as we believe in the utility of biology to industry, hygiene, eugenics and the rest of man's material welfare, a thousand times more do we believe in its utility to his higher interests, especially just now when "Christian civilization" seems bent upon putting into practise the monstrously perverted biological theory of survival of the fittest, and destroying itself through military and economic war.

Concerning what Mr. Scripps's business experience and acumen have meant for the physical development of the institution, I will be

specific only with reference to two matters. First, that of the location of the institution. The idea of getting the present 177-acre site and of using it as it is being used originated with him and with him alone; and securing the land would have been impossible without him. But for his leadership in this we should now be in the little three-acre park in La Jolla. The enormous advantage of the present location as compared with the former one is becoming apparent to everybody connected with the institution. Second, the plan of having a business manager who alone should have charge of all monetary affairs of the institution. The wisdom and practicability of separating the business and scientific work of such an enterprise would seem so obvious that it is surprising that any other plan should be thought of except as a temporary makeshift. Yet the time and strength of many scientific men are consumed with business matters which their incompetence makes much more costly in time and money than the employment of a business manager would be.

The money, about $40,000 all told, "invested" in the enterprise by Mr. Scripps, though of very substantial aid in developing the "plant" and in maintenance, for which uses it has been given at different times and in varying sums, is of minor importance compared with the business experience and the ideas which he has contributed.

Wm. E. Ritter

Scripps Institution for Biological Research of the University of California, La Jolla, Calif.

PSYCHOLOGY AS CONTRABAND

To the Editor of Science: Some weeks ago the State Department reported the seizure by the British government of a package of books sent from Germany through Holland to the Psychological Review Company. The president of the company, who is also editor of the *Psychological Review*, wrote to the American Consul General at London, stating that these books were scientific in character and essentially neutral. He suggested that the British authorities mention the titles and authors to any British psychologist and expressed confidence that any such expert would substantiate our statement.

The Consul General in due time replied that the British Procurator General had finally ruled that "such publications were not entitled to free transit."

The *Psychological Review* will not contest this decision in the British courts, but we wish to submit our case to the scientific world at home and abroad. Is there any good reason for hampering scientific progress by a policy of this sort? Would not the British psychologists do well to petition for a commission to determine the mental status of their Procurator General?

Howard C. Warren

Psychological Review Company, Princeton, N. J.,

November 15, 1916

QUOTATIONS

FOOD CONTROL

The decision of the board of trade, announced by Mr. Runciman on November 15, to appoint a food controller, has naturally excited a great deal of public interest, and more has been read into the announcement than it actually contained. The orders so far made by the board of trade under the Defence of the Realm Regulations apply to milk, flour and potatoes. The price of milk must not be raised above that paid at November 15, 1916, and the price may not exceed by more than a specified amount—in the case of retail milk 2d. a quart—the price in the corresponding month before the war. The order as to potatoes requires a return of potato stocks. The order which will have most effect in its influence on our daily diet is that which deals with flour. It affords an instance of how an agitation, unsuccessful in peace time, may succeed in its object under the stress of war conditions. The severe restriction of the hours during which alcoholic liquors may be sold, and the introduction of "summer time," or daylight saving, as it has been called, are other examples. The regulation prohibits for the future the production of any flour except such as would have been